```sql
-- Create Employee Table
CREATE TABLE Employee (
    Fname VARCHAR(50),
    Lname VARCHAR(50),
    SSN VARCHAR(20) PRIMARY KEY,
    BDATE DATE,
    Address VARCHAR(200),
    Sex CHAR(1),
    Salary DECIMAL(10,2),
    Superssn VARCHAR(20),
    Dno INT
);

-- Create Department Table
CREATE TABLE Department (
    Dname VARCHAR(50),
    DNum INT PRIMARY KEY,
    MGRSSN VARCHAR(20),
    MGRStartDate DATE
);

-- Create Project Table
CREATE TABLE Project (
    Pname VARCHAR(50),
    Pnumber INT PRIMARY KEY,
    Plocation VARCHAR(100),
    City VARCHAR(50),
    Dnum INT
);

-- Create Works_for Table
CREATE TABLE Works_for (
    ESSN VARCHAR(20),
    Pno INT,
```

```sql
30
31    -- Create Works_for Table
32  v CREATE TABLE Works_for (
33        ESSN VARCHAR(20),
34        Pno INT,
35        Hours INT,
36        PRIMARY KEY (ESSN, Pno)
37    );
38
39    -- Create Dependent Table
40  v CREATE TABLE Dependent (
41        ESSN VARCHAR(20),
42        Dependent_name VARCHAR(100),
43        Sex CHAR(1),
44        Bdate DATE,
45        PRIMARY KEY (ESSN, Dependent_name)
46    );
47
48    -- Add Foreign Key Constraints
49    ALTER TABLE Employee ADD FOREIGN KEY (Superssn) REFERENCES Employee(SSN);
50    ALTER TABLE Employee ADD FOREIGN KEY (Dno) REFERENCES Department(DNum);
51    ALTER TABLE Department ADD FOREIGN KEY (MGRSSN) REFERENCES Employee(SSN);
52    ALTER TABLE Project ADD FOREIGN KEY (Dnum) REFERENCES Department(DNum);
53    ALTER TABLE Works_for ADD FOREIGN KEY (ESSN) REFERENCES Employee(SSN);
54    ALTER TABLE Works_for ADD FOREIGN KEY (Pno) REFERENCES Project(Pnumber);
55    ALTER TABLE Dependent ADD FOREIGN KEY (ESSN) REFERENCES Employee(SSN);
56
57    -- =====================================
58    -- 2. INSERT DATA
59    -- =====================================
60
61    -- Insert Departments first (without managers)
62    INSERT INTO Department VALUES ('DP1', 10, NULL, '2005-01-01');
63    INSERT INTO Department VALUES ('DP2', 20, NULL, '2006-03-01');
64    INSERT INTO Department VALUES ('DP3', 30, NULL, '2006-06-01');
```

```sql
-- ====================================
-- 2. INSERT DATA
-- ====================================


-- Insert Departments first (without managers)
INSERT INTO Department VALUES ('DP1', 10, NULL, '2005-01-01');
INSERT INTO Department VALUES ('DP2', 20, NULL, '2006-03-01');
INSERT INTO Department VALUES ('DP3', 30, NULL, '2006-06-01');

-- Insert Employees in correct hierarchical order
-- Level 1: Employees with no supervisors or circular references
INSERT INTO Employee VALUES ('Amr', 'Omran', '321654', '1963-09-14', '44 Hilopolis.Cairo', 'M', 2500, NULL, NULL);

-- Level 2: Employees supervised by Level 1
INSERT INTO Employee VALUES ('Kamel', 'Mohamed', '223344', '1970-10-15', '38 Mohy el dien abo el Ezz St.Cairo', 'M', 1800,
INSERT INTO Employee VALUES ('Noha', 'Mohamed', '968574', '1975-02-01', '55 Orabi St. El Mohandiseen.Cairo', 'F', 1600, '32:
INSERT INTO Employee VALUES ('Edward', 'Hanna', '512463', '1972-08-19', '18 Abaas El 3akaad St. Nasr City.Cairo', 'M', 1500,

-- Level 3: Employees supervised by Level 2
INSERT INTO Employee VALUES ('Ahmed', 'Ali', '112233', '1965-01-01', '15 Ali fahmy St.Giza', 'M', 1300, '223344', 10);
INSERT INTO Employee VALUES ('Hanaa', 'Sobhy', '123456', '1973-03-18', '38 Abdel Khalik Tharwat St. Downtown.Cairo', 'F', 8(
INSERT INTO Employee VALUES ('Mariam', 'Adel', '669955', '1982-06-12', '269 El-Haram st. Giza', 'F', 750, '512463', 20);
INSERT INTO Employee VALUES ('Maged', 'Raoof', '521634', '1980-04-06', '18 Kholosi st.Shobra.Cairo', 'M', 1000, '968574', 3(

-- Update Department managers
UPDATE Department SET MGRSSN = '223344' WHERE DNum = 10;
UPDATE Department SET MGRSSN = '968574' WHERE DNum = 20;
UPDATE Department SET MGRSSN = '512463' WHERE DNum = 30;

-- Insert Projects
INSERT INTO Project VALUES ('AL Solimaniah', 100, 'Cairo_Alex Road', 'Alex', 10);
INSERT INTO Project VALUES ('Al Rabwah', 200, '6th of October City', 'Giza', 10);
INSERT INTO Project VALUES ('Al Rawdah', 300, 'Zaied City', 'Giza', 10);
INSERT INTO Project VALUES ('Al Rowad', 400, 'Cairo_Faiyom Road', 'Giza', 20);
```

```sql
-- Insert Projects
INSERT INTO Project VALUES ('AL Solimaniah', 100, 'Cairo_Alex Road', 'Alex', 10);
INSERT INTO Project VALUES ('Al Rabwah', 200, '6th of October City', 'Giza', 10);
INSERT INTO Project VALUES ('Al Rawdah', 300, 'Zaied City', 'Giza', 10);
INSERT INTO Project VALUES ('Al Rowad', 400, 'Cairo_Faiyom Road', 'Giza', 20);
INSERT INTO Project VALUES ('Al Rehab', 500, 'Nasr City', 'Cairo', 30);
INSERT INTO Project VALUES ('Pitcho american', 600, 'Maady', 'Cairo', 30);
INSERT INTO Project VALUES ('Ebad El Rahman', 700, 'Ring Road', 'Cairo', 20);

-- Insert Works_for relationships
INSERT INTO Works_for VALUES ('223344', 100, 10);
INSERT INTO Works_for VALUES ('223344', 200, 10);
INSERT INTO Works_for VALUES ('223344', 300, 10);
INSERT INTO Works_for VALUES ('112233', 100, 40);
INSERT INTO Works_for VALUES ('968574', 400, 15);
INSERT INTO Works_for VALUES ('968574', 700, 15);
INSERT INTO Works_for VALUES ('968574', 300, 10);
INSERT INTO Works_for VALUES ('669955', 400, 20);
INSERT INTO Works_for VALUES ('223344', 500, 10);
INSERT INTO Works_for VALUES ('669955', 700, 7);
INSERT INTO Works_for VALUES ('669955', 300, 10);
INSERT INTO Works_for VALUES ('512463', 500, 10);
INSERT INTO Works_for VALUES ('512463', 600, 25);
INSERT INTO Works_for VALUES ('521634', 500, 10);
INSERT INTO Works_for VALUES ('521634', 600, 20);
INSERT INTO Works_for VALUES ('521634', 300, 6);
INSERT INTO Works_for VALUES ('521634', 400, 4);

-- Insert Dependents
INSERT INTO Dependent VALUES ('112233', 'Hala Saied Ali', 'F', '1970-10-18');
INSERT INTO Dependent VALUES ('223344', 'Ahmed Kamel Shawki', 'M', '1998-03-27');
INSERT INTO Dependent VALUES ('223344', 'Mona Adel Mohamed', 'F', '1975-04-25');
INSERT INTO Dependent VALUES ('321654', 'Ramy Amr Omran', 'M', '1990-01-26');
INSERT INTO Dependent VALUES ('321654', 'Omar Amr Omran', 'M', '1993-03-30');
```

```sql
117    INSERT INTO Dependent VALUES ('223344', 'Mona Adel Mohamed', 'F', '1975-04-25');
118    INSERT INTO Dependent VALUES ('321654', 'Ramy Amr Omran', 'M', '1990-01-26');
119    INSERT INTO Dependent VALUES ('321654', 'Omar Amr Omran', 'M', '1993-03-30');
120    INSERT INTO Dependent VALUES ('321654', 'Sanaa Gawish', 'F', '1973-05-16');
121    INSERT INTO Dependent VALUES ('512463', 'Sara Edward', 'F', '2001-09-15');
122    INSERT INTO Dependent VALUES ('512463', 'Nora Ghaly', 'F', '1976-06-22');
123
124    -- =====================================
125    -- 3. LAB3 QUERIES SOLUTIONS
126    -- =====================================
127
128    -- 1. Display the Department id, name and id and the name of its manager
129    SELECT
130        D.DNum AS "Department ID",
131        D.Dname AS "Department Name",
132        E.SSN AS "Manager ID",
133        CONCAT(E.Fname, ' ', E.Lname) AS "Manager Name"
134    FROM Department D
135    JOIN Employee E ON D.MGRSSN = E.SSN;
136
137    -- 2. Display the name of the departments and the name of the projects under its control
138    SELECT
139        D.Dname AS "Department Name",
140        P.Pname AS "Project Name"
141    FROM Department D
142    JOIN Project P ON D.DNum = P.Dnum
143    ORDER BY D.Dname, P.Pname;
144
145    -- 3. Display the full data about all the dependents with the name of employee they depend on
146    SELECT
147        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
148        D.ESSN,
149        D.Dependent_name,
150        D.Sex AS "Dependent Gender",
```

```sql
124    -- =======================================
125    -- 3. LAB3 QUERIES SOLUTIONS
126    -- =======================================
127
128    -- 1. Display the Department id, name and id and the name of its manager
129    SELECT
130        D.DNum AS "Department ID",
131        D.Dname AS "Department Name",
132        E.SSN AS "Manager ID",
133        CONCAT(E.Fname, ' ', E.Lname) AS "Manager Name"
134    FROM Department D
135    JOIN Employee E ON D.MGRSSN = E.SSN;
136
137    -- 2. Display the name of the departments and the name of the projects under its control
138    SELECT
139        D.Dname AS "Department Name",
140        P.Pname AS "Project Name"
```

Data Output   Messages   Notifications

Showing rows: 1 to 3   Page No: 1

	Department ID 🔒 integer	Department Name 🔒 character varying (50)	Manager ID 🔒 character varying (20)	Manager Name 🔒 text
1	10	DP1	223344	Kamel Mohamed
2	20	DP2	968574	Noha Mohamed
3	30	DP3	512463	Edward Hanna

```sql
145    -- 3. Display the full data about all the dependents with the name of employee they depend on
146  v SELECT
147        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
148        D.ESSN,
149        D.Dependent_name,
150        D.Sex AS "Dependent Gender",
151        D.Bdate AS "Dependent Birthdate"
152    FROM Dependent D
153    JOIN Employee E ON D.ESSN = E.SSN
154    ORDER BY E.Lname, E.Fname;
155
156    -- 4. Display using Union Function
157    -- a. Female dependents depending on Female Employee
158    -- b. Male dependents depending on Male Employee
159  v SELECT
160        D.Dependent_name AS "Dependent Name",
```

Data Output   Messages   Notifications

Showing rows: 1 to 8   Page No: 1

	Employee Name text	essn [PK] character varying (20)	dependent_name [PK] character varying (100)	Dependent Gender character (1)	Dependent Birthdate date
1	Ahmed Ali	112233	Hala Saied Ali	F	1970-10-18
2	Edward Hanna	512463	Nora Ghaly	F	1976-06-22
3	Edward Hanna	512463	Sara Edward	F	2001-09-15
4	Kamel Mohamed	223344	Ahmed Kamel Shawki	M	1998-03-27
5	Kamel Mohamed	223344	Mona Adel Mohamed	F	1975-04-25
6	Amr Omran	321654	Ramy Amr Omran	M	1990-01-26
7	Amr Omran	321654	Omar Amr Omran	M	1993-03-30
8	Amr Omran	321654	Sanaa Gawish	F	1973-05-16

```sql
136
137    -- 2. Display the name of the departments and the name of the projects under its control
138 ∨ SELECT
139        D.Dname AS "Department Name",
140        P.Pname AS "Project Name"
141    FROM Department D
142    JOIN Project P ON D.DNum = P.Dnum
143    ORDER BY D.Dname, P.Pname;
144
145    -- 3. Display the full data about all the dependents with the name of employee they depend on
146 ∨ SELECT
147        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
148        D.ESSN,
149        D.Dependent_name,
150        D.Sex AS "Dependent Gender",
```

Data Output   Messages   Notifications

≡₊ ▯ ∨ ▢ ∨ 🗑 🔲 ⬇ ∿ SQL   Showing rows: 1 to 7 ✎   Page No: 1

	Department Name character varying (50) 🔒	Project Name character varying (50) 🔒
1	DP1	Al Rabwah
2	DP1	Al Rawdah
3	DP1	AL Solimaniah
4	DP2	Al Rowad
5	DP2	Ebad El Rahman
6	DP3	Al Rehab
7	DP3	Pitcho american

```sql
58    -- b. Male dependents depending on Male Employee
59 ⌄  SELECT
60        D.Dependent_name AS "Dependent Name",
61        D.Sex AS "Dependent Gender",
62        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
63        'Female Dependent on Female Employee' AS "Category"
64    FROM Dependent D
65    JOIN Employee E ON D.ESSN = E.SSN
66    WHERE D.Sex = 'F' AND E.Sex = 'F'
67
68    UNION
69
70    SELECT
71        D.Dependent_name AS "Dependent Name",
72        D.Sex AS "Dependent Gender",
73        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
74        'Male Dependent on Male Employee' AS "Category"
75    FROM Dependent D
76    JOIN Employee E ON D.ESSN = E.SSN
77    WHERE D.Sex = 'M' AND E.Sex = 'M'
78    ORDER BY "Category", "Dependent Name";
```

Data Output   Messages   Notifications

Showing rows: 1 to 3   Page No: 1

Dependent Name character varying (100)	Dependent Gender character (1)	Employee Name text	Category text
Ahmed Kamel Shawki	M	Kamel Mohamed	Male Dependent on Male Employee
Omar Amr Omran	M	Amr Omran	Male Dependent on Male Employee
Ramy Amr Omran	M	Amr Omran	Male Dependent on Male Employee

```sql
180   -- 5. Display the Id, name and location of projects in Cairo or Alex city
181 v SELECT
182       Pnumber AS "Project ID",
183       Pname AS "Project Name",
184       Plocation AS "Project Location"
185   FROM Project
186   WHERE City IN ('Cairo', 'Alex')
187   ORDER BY City, Pname;
188
189   -- 6. Display the Projects full data of projects with name starting with "a" letter
190 v SELECT *
191   FROM Project
192   WHERE UPPER(Pname) LIKE 'A%'
193   ORDER BY Pname;
194
195   -- 7. Display all employees in department 30 whose salary is between 1000 to 2000 LE monthly
```

Data Output   Messages   Notifications

Showing rows: 1 to 4   Page

	Project ID integer	Project Name character varying (50)	Project Location character varying (100)
1	100	AL Solimaniah	Cairo_Alex Road
2	500	Al Rehab	Nasr City
3	700	Ebad El Rahman	Ring Road
4	600	Pitcho american	Maady

```sql
189    -- 6. Display the Projects full dat[F5]    cts with name starting with "a" letter
190 ∨  SELECT *
191    FROM Project
192    WHERE UPPER(Pname) LIKE 'A%'
193    ORDER BY Pname;
194
195    -- 7. Display all employees in department 30 whose salary is between 1000 to 2000 LE monthly
196 ∨  SELECT
197        SSN,
198        CONCAT(Fname, ' ', Lname) AS "Employee Name",
199        Salary,
200        Dno AS "Department Number"
201    FROM Employee
202    WHERE Dno = 30 AND Salary BETWEEN 1000 AND 2000
203    ORDER BY Salary DESC;
204
205    -- 8. Retrieve names of all employees in department 10 who work >= 10 hours per week on "AL
206 ∨  SELECT DISTINCT
207        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name"
208    FROM Employee E
```

Data Output   Messages   Notifications

Showing rows: 1 to 5   Page N

pname character varying (50)	pnumber [PK] integer	plocation character varying (100)	city character varying (50)	dnum integer
1	Al Rabwah	200	6th of October City	Giza	10
2	Al Rawdah	300	Zaied City	Giza	10
3	Al Rehab	500	Nasr City	Cairo	30
4	Al Rowad	400	Cairo_Faiyom Road	Giza	20
5	AL Solimaniah	100	Cairo_Alex Road	Alex	10

```sql
204
205    -- 8. Retrieve names of all employees in department 10 who work >= 10 hours per week on "AL
206  ⌄ SELECT DISTINCT
207        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name"
208    FROM Employee E
209    JOIN Works_for W ON E.SSN = W.ESSN
210    JOIN Project P ON W.Pno = P.Pnumber
211    WHERE E.Dno = 10
212      AND P.Pname = 'Al Rabwah'
213      AND W.Hours >= 10;
214
215    -- 9. Find names of employees who are directly supervised by Kamel Mohamed
216  ⌄ SELECT
217        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name"
218    FROM Employee E
219    WHERE E.Superssn = '223344'   -- Kamel Mohamed's SSN
220    ORDER BY E.Lname, E.Fname;
221
```

Data Output   Messages   Notifications

Showing rows: 1 to 1   Page

Employee Name 🔒 text
1   Kamel Mohamed

```sql
195     -- 7. Display all employees in department 30 whose salary is between 1000 to 2000 LE monthly
196  ∨  SELECT
197         SSN,
198         CONCAT(Fname, ' ', Lname) AS "Employee Name",
199         Salary,
200         Dno AS "Department Number"
201     FROM Employee
202     WHERE Dno = 30 AND Salary BETWEEN 1000 AND 2000
203     ORDER BY Salary DESC;
204
205     -- 8. Retrieve names of all employees in department 10 who work >= 10 hours per week on "AL Rabw
206  ∨  SELECT DISTINCT
207         CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name"
208     FROM Employee E
209     JOIN Works_for W ON E.SSN = W.ESSN
210     JOIN Project P ON W.Pno = P.Pnumber
211     WHERE E.Dno = 10
212       AND P.Pname = 'Al Rabwah'
213       AND W.Hours >= 10;
```

Data Output   Messages   Notifications

Showing rows: 1 to 2   Page No:

ssn [PK] character varying (20)	Employee Name text	salary numeric (10,2)	Department Number integer
1	512463	Edward Hanna	1500.00	30
2	521634	Maged Raoof	1000.00	30

```sql
214
215   -- 9. Find names of employees who are directly supervised by Kamel Mohamed
216 ∨ SELECT
217       CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name"
218   FROM Employee E
219   WHERE E.Superssn = '223344'  -- Kamel Mohamed's SSN
220   ORDER BY E.Lname, E.Fname;
221
222   -- 10. For each project, list project name and total hours per week spent on that project
223 ∨ SELECT
224       P.Pname AS "Project Name",
225       COALESCE(SUM(W.Hours), 0) AS "Total Hours Per Week"
226   FROM Project P
227   LEFT JOIN Works_for W ON P.Pnumber = W.Pno
228   GROUP BY P.Pnumber, P.Pname
229   ORDER BY "Total Hours Per Week" DESC;
230
231   -- 11. Retrieve names of all employees and projects they work on, sorted by project name
232 ·· SELECT
```

Data Output   Messages   Notifications

	Employee Name 🔒 text
1	Ahmed Ali
2	Hanaa Sobhy

Showing rows: 1 to 2

```sql
221
222    -- 10. For each project, list project name and total hours per week spent on that project
223  ∨ SELECT
224        P.Pname AS "Project Name",
225        COALESCE(SUM(W.Hours), 0) AS "Total Hours Per Week"
226    FROM Project P
227    LEFT JOIN Works_for W ON P.Pnumber = W.Pno
228    GROUP BY P.Pnumber, P.Pname
229    ORDER BY "Total Hours Per Week" DESC;
230
231    -- 11. Retrieve names of all employees and projects they work on, sorted by project name
232  ∨ SELECT
            P Pname AS "Project Name"
```

Data Output   Messages   Notifications

Showing rows: 1 to 7   Page No:

	Project Name character varying (50)	Total Hours Per Week bigint
1	AL Solimaniah	50
2	Pitcho american	45
3	Al Rowad	39
4	Al Rawdah	36
5	Al Rehab	30
6	Ebad El Rahman	22
7	Al Rabwah	10

```sql
231    -- 11. Retrieve names of all employees and projects they work on, sorted by project name
232  ∨ SELECT
233        P.Pname AS "Project Name",
234        CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
235        W.Hours
236    FROM Employee E
237    JOIN Works_for W ON E.SSN = W.ESSN
238    JOIN Project P ON W.Pno = P.Pnumber
239    ORDER BY P.Pname, E.Lname, E.Fname;
240
241    -- 12. Display data of department which has the employee with smallest SSN
242  ∨ SELECT D.*
243    FROM Department D
244    JOIN Employee E ON D.DNum = E.Dno
```

Data Output   Messages   Notifications

≡₊ 🗎 ∨ 📋 ∨ 🗑 🗄 ⬇ 〜 SQL   Showing rows: 1 to 17 ✏   Page No:

	Project Name character varying (50) 🔒	Employee Name 🔒 text	hours 🔒 integer
1	Al Rabwah	Kamel Mohamed	10
2	Al Rawdah	Mariam Adel	10
3	Al Rawdah	Kamel Mohamed	10
4	Al Rawdah	Noha Mohamed	10
5	Al Rawdah	Maged Raoof	6
6	Al Rehab	Edward Hanna	10
7	Al Rehab	Kamel Mohamed	10
8	Al Rehab	Maged Raoof	10
9	Al Rowad	Mariam Adel	20
10	Al Rowad	Noha Mohamed	15
11	Al Rowad	Maged Raoof	4

```sql
-- 14. List last names of all managers who have no dependents
SELECT DISTINCT E.Lname AS "Manager Last Name"
FROM Employee E
JOIN Department D ON E.SSN = D.MGRSSN
WHERE E.SSN NOT IN (SELECT DISTINCT ESSN FROM Dependent)
ORDER BY E.Lname;

-- 15. For each department with average salary < overall average, display number, name,
SELECT
    D.DNum AS "Department Number",
    D.Dname AS "Department Name",
    COUNT(E.SSN) AS "Number of Employees",
    ROUND(AVG(E.Salary), 2) AS "Department Average Salary"
FROM Department D
```

Data Output   Messages   Notifications

Showing rows: 1 to 1

	Manager Last Name character varying (50)
1	Mohamed

```sql
247    -- 13. For each department, retrieve department name and max, min, avg salary of employees
248  ∨ SELECT
249        D.Dname AS "Department Name",
250        COUNT(E.SSN) AS "Number of Employees",
251        MAX(E.Salary) AS "Maximum Salary",
252        MIN(E.Salary) AS "Minimum Salary",
253        ROUND(AVG(E.Salary), 2) AS "Average Salary"
254    FROM Department D
255    LEFT JOIN Employee E ON D.DNum = E.Dno
256    GROUP BY D.DNum, D.Dname
257    ORDER BY D.DNum;
258
259    -- 14. List last names of all managers who have no dependents
260  ∨ SELECT DISTINCT E.Lname AS "Manager Last Name"
```

Data Output   Messages   Notifications
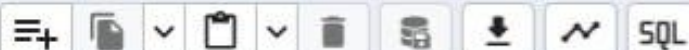
Showing rows: 1 to 3   Page No: 1

	Department Name character varying (50)	Number of Employees bigint	Maximum Salary numeric	Minimum Salary numeric	Average Salary numeric
1	DP1	3	1800.00	800.00	1300.00
2	DP2	2	1600.00	750.00	1175.00
3	DP3	2	1500.00	1000.00	1250.00

```sql
241    -- 12. Display data of department which has the employee with smallest SSN
242  ∨ SELECT D.*
243    FROM Department D
244    JOIN Employee E ON D.DNum = E.Dno
245    WHERE E.SSN = (SELECT MIN(SSN) FROM Employee);
246
247    -- 13. For each department, retrieve department name and max, min, avg salary of employees
248  ∨ SELECT
249        D.Dname AS "Department Name",
250        COUNT(E.SSN) AS "Number of Employees",
251        MAX(E.Salary) AS "Maximum Salary",
252        MIN(E.Salary) AS "Minimum Salary",
253        ROUND(AVG(E.Salary), 2) AS "Average Salary"
254    FROM Department D
```

Data Output   Messages   Notifications

Showing rows: 1 to 1   ✎   Page No: 1

	dname character varying (50)	dnum [PK] integer	mgrssn character varying (20)	mgrstartdate date
1	DP1	10	223344	2005-01-01

```sql
-- 16. Retrieve employees and their projects ordered by department, then by last name, first name
SELECT
    D.Dname AS "Department",
    CONCAT(E.Fname, ' ', E.Lname) AS "Employee Name",
    P.Pname AS "Project Name",
    W.Hours
FROM Employee E
JOIN Department D ON E.Dno = D.DNum
JOIN Works_for W ON E.SSN = W.ESSN
JOIN Project P ON W.Pno = P.Pnumber
ORDER BY D.DNum, E.Lname, E.Fname, P.Pname;

-- 17. For each project in Cairo, find project number, controlling department name,
-- department manager last name, address and birthdate
```

Data Output   Messages   Notifications

Showing rows: 1 to 17 | Page No: 1 | of 1

	Department character varying (50)	Employee Name text	Project Name character varying (50)	hours integer
1	DP1	Ahmed Ali	AL Solimaniah	40
2	DP1	Kamel Mohamed	Al Rabwah	10
3	DP1	Kamel Mohamed	Al Rawdah	10
4	DP1	Kamel Mohamed	Al Rehab	10
5	DP1	Kamel Mohamed	AL Solimaniah	10
6	DP2	Mariam Adel	Al Rawdah	10
7	DP2	Mariam Adel	Al Rowad	20
8	DP2	Mariam Adel	Ebad El Rahman	7
9	DP2	Noha Mohamed	Al Rawdah	10
10	DP2	Noha Mohamed	Al Rowad	15
11	DP2	Noha Mohamed	Ebad El Rahman	15

```sql
266    -- 15. For each department with average salary < overall average, display number, name, and employee
267  ∨ SELECT
268        D.DNum AS "Department Number",
269        D.Dname AS "Department Name",
270        COUNT(E.SSN) AS "Number of Employees",
271        ROUND(AVG(E.Salary), 2) AS "Department Average Salary"
272    FROM Department D
273    LEFT JOIN Employee E ON D.DNum = E.Dno
274    GROUP BY D.DNum, D.Dname
275    HAVING AVG(E.Salary) < (SELECT AVG(Salary) FROM Employee WHERE Salary IS NOT NULL)
276    ORDER BY D.DNum;
277
278    -- 16. Retrieve employees and their projects ordered by department, then by last name, first name
279  ∨ SELECT
280        D.Dname AS "Department",
```

Data Output   Messages   Notifications

Showing rows: 1 to 3   Page No: 1

	Department Number integer	Department Name character varying (50)	Number of Employees bigint	Department Average Salary numeric
1	10	DP1	3	1300.00
2	20	DP2	2	1175.00
3	30	DP3	2	1250.00

```sql
290   -- 17. For each project in Cairo, find project number, controlling department name,
291   -- department manager last name, address and birthdate
292 ∨ SELECT
293       P.Pnumber AS "Project Number",
294       P.Pname AS "Project Name",
295       D.Dname AS "Department Name",
296       E.Lname AS "Manager Last Name",
297       E.Address AS "Manager Address",
298       E.BDATE AS "Manager Birthdate"
299   FROM Project P
300   JOIN Department D ON P.Dnum = D.DNum
301   JOIN Employee E ON D.MGRSSN = E.SSN
302   WHERE UPPER(P.City) = 'CAIRO'
303   ORDER BY P.Pnumber;
304
```

Data Output   Messages   Notifications

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	Project Number integer	Project Name character varying (50)	Department Name character varying (50)	Manager Last Name character varying (50)	Manager Address character varying (200)	Manager Birthdate date
1	500	Al Rehab	DP3	Hanna	18 Abaas El 3akaad St. Nasr City.Cairo	1972-08-19
2	600	Pitcho american	DP3	Hanna	18 Abaas El 3akaad St. Nasr City.Cairo	1972-08-19
3	700	Ebad El Rahman	DP2	Mohamed	55 Orabi St. El Mohandiseen.Cairo	1975-02-01